

## SEQUENCE LISTING

<110> de Jong, Gary  
 Vandebyl, Sandra  
 Perez, Carl  
 Hoekstra, Richard  
 Volker, Oberle

<120> METHODS FOR DELIVERING NUCLEIC ACID MOLECULES INTO CELLS AND  
 ASSESSMENT THEREOF

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| ccgcggggcg  | tcgggaccgg  | ggtccgggtgc | ggagagccgt  | tcgtcttggg  | aaacgggggtg | 18300 |
| cggccggaaa  | ggggggccgcc | ctctcgcccc  | tcacgttgaa  | cgcacgttcg  | tgtggaacct  | 18360 |
| ggcgctaaac  | cattcgtaga  | cgacctgctt  | ctgggtcggg  | gtttcgtacg  | tagcagagca  | 18420 |
| gctccctcgc  | tgcgatctat  | tgaaagtacg  | ccctcgacac  | aagggtttgt  | ctctgcgggc  | 18480 |
| tttcccgctg  | cacgcccgtc  | cgctcgacag  | cgaccgtgtc  | gccgccccgg  | cgtcacgggg  | 18540 |
| gcggtcgctt  | cggcccccg   | gcggttgccc  | gaacgaccgt  | gtggtggttg  | gggggggggat | 18600 |
| cgtcttctcc  | tcggtctccc  | gaggacggtt  | cgcttctctt  | tcctcttccg  | tcgctctcct  | 18660 |
| tgggtgtggg  | agcctcgctg  | cgctcgacac  | gcggcctgcc  | gtcgctgccc  | gccgcagccc  | 18720 |
| cttgccctcc  | ggccttgggc  | aagccggagg  | gcggaggagg  | gggatcggcg  | gcggcggcga  | 18780 |
| ccgcggcgcg  | gtgacgcacg  | gtgggatccc  | catcctcggc  | gcgtccgtcg  | gggacggccg  | 18840 |
| gttgaggggg  | cgggaggggg  | ttttcccggt  | aacgcgcgt   | tcggcgccag  | gcctctggcg  | 18900 |
| gccggggggg  | cgctctctcc  | gcccagagcat | ccccactccc  | gccccctctc  | ttcgcgcgcc  | 18960 |
| gcggcgggga  | cgtgcgtacg  | aggggaggat  | gtcgcgggtg  | ggaggcggag  | agggctccggc | 19020 |
| gcggcgccct  | ttccattttt  | tcctcccaaa  | ctccggatgt  | cgaccagtac  | tcggggcgac  | 19080 |
| actttgtttt  | ttttttttcc  | cccgatgctg  | gaggtcgacc  | agatgtccga  | aagtgtcccc  | 19140 |
| cccccccccc  | ccccccggcg  | cggagcggcg  | gggcccactct | ggactctttt  | tttttttttt  | 19200 |
| tttttttttt  | ttaaattcct  | ggaaccttta  | ggtcgaccag  | ttgtccgtct  | tttactcctt  | 19260 |
| catataggtc  | gaccagtact  | ccgggtggta  | ctttgtcttt  | ttctgaaaat  | cccagaggtc  | 19320 |
| gaccagatag  | ccgaaagtcc  | tctctttccc  | tttactcttc  | cccacagcga  | ttctcttttt  | 19380 |
| tttttttttt  | tttggtgtgc  | ctcttttttga | cttatataca  | tgtaaatagt  | gtgtacgttt  | 19440 |
| atatacttat  | aggaggagggt | cgaccagtac  | tccgggcgac  | actttgtttt  | tttttttttt  | 19500 |
| tcacccgatg  | atggagggtcg | accagatgtc  | cgaaagtgtc  | ccgtcccccc  | cctccccccc  | 19560 |
| ccgcgacgog  | gcgggctcac  | tctggactct  | tttttttttt  | tttttttttt  | tttaaatttc  | 19620 |
| tggaaacctta | aggtcgacca  | gttgtccgtc  | ttttactcat  | tcatataggt  | cgaccgggtg  | 19680 |
| tactttgtct  | ttttctgaaa  | atcgacagag  | tcgaccagat  | gtcagaaagt  | ctggtggtcg  | 19740 |
| ataaattatc  | tgatctagat  | ttgtttttct  | gtttttcagt  | tttgtgttgt  | tttgtgttgt  | 19800 |
| tttgtgttgt  | tttgttttgt  | tttgttttgt  | tttgttttgt  | tttgttttgt  | tttgttttgt  | 19860 |
| tttgtgttgt  | gttgtgttgt  | gttgtgttgt  | gttgggttgg  | gttgggttgg  | gttgggttgg  | 19920 |
| gttgggttgg  | gttgggttgt  | gttgttttgt  | tttgtgttgt  | tttgtgttgt  | tttgtgttgt  | 19980 |
| tttgtgttgt  | tttgttttgt  | ttttgcgggt  | cgaacagttg  | tccttaaccg  | agtttttttg  | 20040 |
| tacacaaaca  | tgactttttt  | ttaaaataaa  | tttttaaaat  | aaatgcgaaa  | atcgaccaat  | 20100 |
| tatccctttc  | cttctctctc  | ttttttaaaa  | attttctttg  | tgtgtgtgtg  | tgtgtgtgtg  | 20160 |
| tgtgtgtgtg  | tgctgtgtgt  | tggtgtgtgt  | cgctgcagctg | gcgcgcgctc  | gttttataaa  | 20220 |
| tacttataat  | aataggtcgc  | cgggtgtgtg  | tactgtcccg  | gactccagag  | gcagagggag  | 20280 |
| gcagacttct  | gagttcgagg  | ccagcctggt  | ctacagagga  | accctgtctc  | gaaaaatgaa  | 20340 |
| aataaataca  | tacatacata  | catacataca  | tacatacata  | catacataca  | tacatatgag  | 20400 |
| gttgaccagt  | tgtcaatcct  | ttagaatttt  | gttttttaatt | aatgtgatag  | agagatagat  | 20460 |
| aatagataga  | tggatagagt  | gatacaataa  | taggtttttt  | tttcagtaaa  | tatgaggttg  | 20520 |
| attaaccact  | tttccctttt  | taggtttttt  | ttttttcccc  | ctgtccatgt  | gggtgctggg  | 20580 |
| atttgaaactc | aggaccctgg  | caggtcaact  | ggaaaacgtg  | ttttctatat  | atataaaatag | 20640 |
| tgggtctgtct | gctgttttgt  | tggttgcttg  | cttgcttget  | tgcttgcttg  | cttgcttgct  | 20700 |
| tgcttttttt  | tttcttctga  | gacagtattt  | ctctgtgtaa  | cctggtgccc  | tgaaactcac  | 20760 |
| tctgtagacc  | agcctggcct  | caatcgaact  | cagaatcctc  | cctgcctctt  | gtctacctcc  | 20820 |
| caatttttga  | gtaaagggtg  | gctacaccac  | tgccctggcat | tattatcatt  | atcattatta  | 20880 |
| attttatttat | tagacagaac  | gaaatcaact  | agttgggtcct | gtttcggttaa | ttcatttgaa  | 20940 |
| attagttgga  | ccaattagtt  | ggctgggttg  | ggaggtttct  | tttgtttccg  | atttggggtg  | 21000 |
| ttgtgggggt  | ggggatcagg  | tatctcaacg  | gaatgcatga  | agggttaagg  | gagatggctc  | 21060 |
| gattttttgt  | aagattactt  | ttcttagctg  | gaggaaaaaa  | taaaataata  | ttgggctacg  | 21120 |
| tttcatttgt  | tcatttctat  | ttctctttct  | ttctttcttt  | ctttcagata  | aggaggtcgg  | 21180 |
| ccagttctct  | ctgccttctg  | gaagatgtag  | gcattgcatt  | gggaaaagca  | ttgtttgaga  | 21240 |
| gatgtgctag  | tgaaccagag  | agtttggtatg | tcaagccgta  | taatgtttat  | tacaatatag  | 21300 |
| aaaagtctta  | acaaagtgat  | ctttaacttt  | tttttttttt  | tttctccttc  | tacttctact  | 21360 |
| tgttctcact  | ctgccaccaa  | cgcgctttgt  | acattgaaatg | tgagctttgt  | tttgcttaac  | 21420 |



|             |             |             |             |            |            |       |
|-------------|-------------|-------------|-------------|------------|------------|-------|
| agacatatat  | ttttttctttt | ggtttttgctt | gacatggttt  | ccctttctat | ccgtgcaggg | 21480 |
| ttcccagacg  | gcctttttgag | aataaaaatgg | gaggccagaa  | ccaaagtctt | ttgaataaag | 21540 |
| caccacaact  | ctaacctgtt  | tggctgtttt  | ccttcccaag  | gcacagatct | ttcccagcat | 21600 |
| ggaaaagcat  | gtagcagttg  | taggacacac  | tagacgagag  | caccagatct | cattgtgggt | 21660 |
| ggtttgtgaac | cacccaccat  | gtggttgcc   | gggatttgaa  | ctcaggatct | tcagaagacg | 21720 |
| agtcagggct  | ctaaaccgat  | gagccatctc  | tccagccctc  | ctacattcct | tcttaaggca | 21780 |
| tgaatgatcc  | cagcatggga  | agacagtctg  | ccctctttgt  | ggtatatcac | catatactca | 21840 |
| ataaaaataat | gaaatgaatg  | aagtctccac  | gtattttattt | cttcgagcta | tctaaattct | 21900 |
| ctcacagcac  | ctccccctcc  | cccacactgc  | ctttctccct  | atgtttgggt | ggggctgggg | 21960 |
| gaggggtggg  | gtgggggcag  | ggatctgcat  | gtcttcttgc  | aggtctgtga | actatttgcg | 22020 |
| atggcctgg   | tctctgaact  | gttgagcctt  | gtctatccag  | aggctgactg | gctagttttc | 22080 |
| tacctgaagt  | ccctgagtga  | tgatttcctt  | gtgaattc    |            |            | 22118 |

&lt;210&gt; 6

&lt;211&gt; 175

&lt;212&gt; DNA

&lt;213&gt; Mus Musculus

&lt;400&gt; 6

|             |            |             |            |            |            |     |
|-------------|------------|-------------|------------|------------|------------|-----|
| ctccccgcgcg | gcccccggtg | tcgcccgttcc | cgtggcgcg  | acaatgcggt | tgtgcgtcca | 60  |
| cgtgtgcgtg  | tccgtgcagt | gccgttgtgg  | agtgcctcgc | tctcctcctc | ctccccggca | 120 |
| gcgttcccac  | ggttggggac | caccggtgac  | ctcgccctct | tcgggccttg | atccg      | 175 |

&lt;210&gt; 7

&lt;211&gt; 755

&lt;212&gt; DNA

&lt;213&gt; Mus musculus

&lt;400&gt; 7

|             |            |             |            |             |             |     |
|-------------|------------|-------------|------------|-------------|-------------|-----|
| ggtctggtgg  | gaattgttga | cctcgctctc  | gggtgcggcc | tttggggaac  | ggcgggggtcg | 60  |
| gtcgtgcccc  | gcgcgggacg | tgtgtcgggg  | ccacttccc  | gctcgagggt  | ggcgggtggcg | 120 |
| gcggcggttg  | tagtctcccc | tgttgctctc  | tcccgggctc | ttggggggggg | tgccgtcggt  | 180 |
| ttcggggcgg  | gcgttgcctg | gcttacgcag  | gcttggtttg | ggactgcctc  | aggagtcgtg  | 240 |
| ggcgggtgtga | ttcccgcggg | ttttgcctcg  | cgtctgcctg | ctttgcctcg  | ggtttgcttg  | 300 |
| gttcgtgtct  | cgggagcggg | ggtttttttt  | tttttcgggt | cccggggaga  | ggggtttttc  | 360 |
| cgggggacgt  | tcccgtcgcc | ccctgcgcgc  | ggtgggtttt | cgtttcgggc  | tgtgttcggt  | 420 |
| tccccctccc  | cgtttcgcgg | tcggttctcc  | ccggtcgggc | ggccctctcc  | ccggtcgggc  | 480 |
| gccccggcgt  | gctgcgggac | cccccttct   | gggggggatg | cccgggcacg  | cacgcgtccg  | 540 |
| ggcggccact  | gtggtccggg | agctgctcgg  | caggcgggtg | agccagttgg  | aggggcgtca  | 600 |
| tgcccccgcg  | ggctcccggt | gcccagcgcg  | cgtgttcttt | ggggggggcct | gtgcgtgcgg  | 660 |
| gaaggctgcg  | cacgttgtcg | gtccttgoga  | gggaaagagg | cttttttttt  | ttaggggggtc | 720 |
| gtccttcgtc  | gtcccgtcgg | cgggtggatcc | ggcct      |             |             | 755 |

&lt;210&gt; 8

&lt;211&gt; 463

&lt;212&gt; DNA

&lt;213&gt; Mus musculus

&lt;400&gt; 8

|             |            |             |            |            |             |     |
|-------------|------------|-------------|------------|------------|-------------|-----|
| ggccgaggtg  | cgtctgcggg | ttggggctcg  | tccggccccg | tcgtcctcgg | ggaaggcgtt  | 60  |
| tagcgggtac  | cgtcgcccg  | ccgaggtggg  | cgcacgtcgg | tgagataacc | ccgagcgtgt  | 120 |
| ttctggttgg  | tggcggcggg | ggctccgggtc | gatgtcttcc | cctccccctc | tccccgagggc | 180 |
| caggtcagcc  | tccgcctgtg | ggcttcgtcg  | gccgtctccc | ccccctcac  | gtccctcgcg  | 240 |
| agcgagcccc  | tccgttcgac | cttccttccg  | ccttcccccc | atctttccgc | gtccggttgg  | 300 |
| ccccgggggtt | ttcacgggcg | ccccacgct   | cctccgcctc | tccgcccgtg | gtttggacgc  | 360 |
| ctgggttccgg | tctccccgcg | aaacccccgg  | tgggttggtc | tccggccccg | gcttgcctct  | 420 |
| cgggtctccc  | aacccccggc | cgggaagggtt | cgggggttcc | ggg        |             | 463 |

&lt;210&gt; 9

&lt;211&gt; 378

&lt;212&gt; DNA



## &lt;213&gt; Mus musculus

&lt;400&gt; 9

|            |            |             |            |             |             |     |
|------------|------------|-------------|------------|-------------|-------------|-----|
| ggattcttca | ggattgaaac | ccaaaccggt  | tcagtttcct | ttccggctcc  | ggccggggggg | 60  |
| ggcggccccc | ggcgggttgg | tgagtttagat | aacctcgggc | cgatcgcaacg | ccccccgtgg  | 120 |
| cggcgacgac | ccattcgaac | gtctgcccta  | tcaactttcg | atggtagtgc  | atgtgcctac  | 180 |
| catggtgacc | acgggtgacg | gggaatcagg  | gttcgattcc | ggagagggag  | cctgagaaac  | 240 |
| ggctaccaca | tccaaggaag | gcagcaggcg  | cgcaaattac | ccactcccga  | cccggggagg  | 300 |
| tagtgacgaa | aaataacaat | acaggactct  | ttcgaggccc | tgtaattgga  | atgagtcac   | 360 |
| tttaaatcct | ttaagcag   |             |            |             |             | 378 |

&lt;210&gt; 10

&lt;211&gt; 378

&lt;212&gt; DNA

&lt;213&gt; Mus musculus

&lt;400&gt; 10

|            |            |            |             |            |            |     |
|------------|------------|------------|-------------|------------|------------|-----|
| gatccattgg | agggcaagtc | tggtgccagc | agccgcggta  | attccagctc | caatagcgta | 60  |
| tattaaagtt | gctgcagtta | aaaagctcgt | agttggatct  | tgggagcggg | cgggcggtcc | 120 |
| gccgcgaggg | gagtcaccgc | ccgtccccgc | cccttgccctc | tcggcgcccc | ctcgatgctc | 180 |
| ttagctgagt | tgctccgcgg | ggcccgaagc | gtttactttg  | aaaaaattag | agttgtttca | 240 |
| aagcaggccc | gagcgcctg  | gataccgcca | gctaggaaat  | aatggaatag | gaccgcggtt | 300 |
| cctattttgt | ttggttttcg | gaactgagcc | catgattaag  | ggaaacggcc | gggggcatcc | 360 |
| ccttattgag | cccccta    |            |             |            |            | 378 |

&lt;210&gt; 11

&lt;211&gt; 719

&lt;212&gt; DNA

&lt;213&gt; Mus musculus

&lt;400&gt; 11

|            |            |            |            |            |            |     |
|------------|------------|------------|------------|------------|------------|-----|
| ggatctttcc | cgctccccgt | tcctccccgc | ccctccaccc | gcgcgtctcc | ccccctcttt | 60  |
| tccccctctc | ggaggggggg | gaggtggggg | cgcgtgggag | gggtcggggg | tggggtcggc | 120 |
| gggggaccgc | ccccggcccg | caaaaggccg | ccgcggggcg | cacttcaacc | gtagcgggtc | 180 |
| gccgcgaccg | gctacgagac | ggctgggaag | gcccgcaggg | gaatgtggct | cggggggggc | 240 |
| ggcgcgtctc | agggcgcgcc | gaaccacctc | accccgagtg | ttacagccct | ccggccgcgc | 300 |
| tttcgcggaa | tcccggggcc | gaggggaagc | ccgatacccc | tcgcccgcgt | ttccccctcc | 360 |
| ccccgtccgc | ctcccggggc | ggcgtggggg | tggggggccg | gccgcccctc | ccacgcccgt | 420 |
| ggtttctctc | tctcccggtc | tcggccgggt | tggggggggg | agcccgggtg | ggggcggggc | 480 |
| ggactgtcct | cagtgcgccc | cgggcgtcgt | cgcgcgctcg | ggcccggggg | gttctctcgg | 540 |
| tcacgccgcc | cccgacgaag | ccgagcgcac | ggggtcggcg | gcgatgtcgg | ctaccacccc | 600 |
| gaaccgtctt | gaaacacgga | ccaaggagtc | taacgcgtgc | gcgagtcagg | ggctcgcacg | 660 |
| aaagccgccg | tggcgcaatg | aaggtgaagg | gccccgtccg | ggggcccag  | gtgggatcc  | 719 |

&lt;210&gt; 12

&lt;211&gt; 685

&lt;212&gt; DNA

&lt;213&gt; Mus musculus

&lt;400&gt; 12

|            |            |            |            |            |            |     |
|------------|------------|------------|------------|------------|------------|-----|
| cgaggcctct | ccagtcgcgc | gagggcgcac | caccggcccc | tctcgcccgc | cgcgctcggg | 60  |
| aggtggagca | cgagcgtacg | cgtaggagcc | cgaaagatgg | tgaactatgc | ctgggcaggg | 120 |
| cgaagccaga | ggaaactctg | gtggaggtcc | gtagcgggtc | tgacgtgcaa | atcggtcgct | 180 |
| cgacctgggt | ataggggcca | aagactaatc | gaaccatcta | gtagctggtt | ccctccgaag | 240 |
| tttccctcag | gatagctggc | gctctcgcaa | ccttcggaag | cagttttatc | cgggtaaagg | 300 |
| cggaatggat | taggaggtct | tggggccgga | aacgatctca | aactatttct | caaactttaa | 360 |
| atgggtaagg | aagcccggct | cgctggcggt | gagccggggc | tggaatgcga | gtgcctagtg | 420 |
| ggccactttt | ggtaagcaga | actggcgctg | cgggatgaac | cgaacgccgg | gttaaggcgc | 480 |
| ccgatgccga | cgctcatcag | accccagaaa | aggtgttggt | tgatatagac | agcaggacgg | 540 |
| tggccatgga | agtcggaatc | cgctaaggag | tgtgtaacaa | ctcacctgcc | gaatcaacta | 600 |
| gccctgaaaa | tggatggcgc | tggagcgctg | ggcccatacc | cggccgctcg | cggcagtcgg | 660 |

aacgggacgg gacgggagcg gccgc

685

&lt;210&gt; 13

&lt;211&gt; 5162

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; Chimeric bacterial plasmid

&lt;400&gt; 13

|             |             |             |            |             |             |      |
|-------------|-------------|-------------|------------|-------------|-------------|------|
| gacggatcgg  | gagatctccc  | gatccctat   | ggtcgactct | cagtacaatc  | tgctctgatg  | 60   |
| ccgcatagtt  | aagccagtat  | ctgctccctg  | cttgtgtgtt | ggaggtcgct  | gagtagtgcg  | 120  |
| cgagcaaaat  | ttaagctaca  | acaaggcaag  | gcttgaccga | caattgcatg  | aagaatctgc  | 180  |
| ttagggtag   | gcgttttgcg  | ctgcttcgcg  | atgtacgggc | cagatatacg  | cgtagacatt  | 240  |
| gattattgac  | tagttattaa  | tagtaatcaa  | ttacgggggc | attagttcat  | agcccatata  | 300  |
| tggagttccg  | cgttacataa  | cttacggtaa  | atggcccgc  | tggtcgaccg  | cccaacgacc  | 360  |
| cccgccatt   | gacgtcaata  | atgacgtatg  | ttcccatagt | aacgccaata  | gggactttcc  | 420  |
| attgacgtca  | atgggtggac  | tatttacggt  | aaactgcccc | cttggcagta  | catcaagtgt  | 480  |
| atcatatgcc  | aagtacgccc  | cctattgacg  | tcaatgacgg | taaatggccc  | gcctggcatt  | 540  |
| atgccagta   | catgacctta  | tgggactttc  | ctacttgga  | gtacatctac  | gtattagtca  | 600  |
| tcgctattac  | catggtgatg  | cggttttggc  | agtacatcaa | tgggcgtgga  | tagcggtttg  | 660  |
| actcacgggg  | atttccaagt  | ctccacccca  | ttgacgtcaa | tgggagtttg  | ttttggcacc  | 720  |
| aaaatcaacg  | ggactttcca  | aaatgtcgta  | acaactccgc | cccattgacg  | caaatgggcg  | 780  |
| gtaggcgtgt  | acggtgggag  | gtctatataa  | gcagagctct | ctggctaact  | agagaaccca  | 840  |
| ctgcttactg  | gcttatcgaa  | attaatacga  | ctcactatag | ggagacccaa  | gcttggtacc  | 900  |
| gagctcggat  | cgatatctgc  | ggccgcgtcg  | acggaattca | gtggatccac  | tagtaacggc  | 960  |
| cgccagtgtg  | ctggaattaa  | ttcgctgtct  | gcgagggcca | gctgttgggg  | tgagtactcc  | 1020 |
| ctctcaaaaag | cgggcatgac  | ttctgcgcta  | agattgtcag | tttccaaaaa  | cgaggaggat  | 1080 |
| ttgatattca  | cctggcccgc  | ggtgatgcct  | ttgagggtag | ccgcgtccat  | ctggtcagaa  | 1140 |
| aagacaatct  | ttttgttgtc  | aagcttgagg  | tgtggcaggc | ttgagatctg  | gccatacact  | 1200 |
| tgagtgacaa  | tgacatccac  | tttgcctttc  | tctccacagg | tgtccactcc  | cagggtccac  | 1260 |
| tgcaggtcga  | gcatgcatct  | agggcggcca  | attccgcccc | tctccctccc  | ccccccctaa  | 1320 |
| cgttactggc  | cgaagccgct  | tggaaataagg | ccggtgtgcg | tttgtctata  | tgtgattttc  | 1380 |
| caccatattg  | ccgtcttttg  | gcaatgtgag  | ggcccggaaa | cctggccctg  | tcttcttgac  | 1440 |
| gagcattcct  | aggggtcttt  | cccctctcgc  | caaaggaatg | caaggtctgt  | tgaatgtcgt  | 1500 |
| gaaggaagca  | gttctcttgg  | aagcttcttg  | aagacaaaca | acgtctgtag  | cgaccctttg  | 1560 |
| caggcagcgg  | aacccccccac | ctggcgacag  | gtgcctctgc | ggccaaaagc  | cacgtgtata  | 1620 |
| agatcacact  | gcaaaggcgg  | cacaacccca  | gtgccacgtt | gtgagttgga  | tagttgtgga  | 1680 |
| aagagtcaaa  | tggctctcct  | caagcgtatt  | caacaagggg | ctgaaggatg  | cccagaagggt | 1740 |
| accccatgtg  | atgggatctg  | atctggggcc  | tcggtgcaca | tgctttacat  | gtgtttagtc  | 1800 |
| gagggttaaaa | aaacgtctag  | gccccccgaa  | ccacggggac | gtgggttttcc | tttgaaaaac  | 1860 |
| acgatgataa  | gcttgccaca  | acccgggatc  | caccggtcgc | caccatgggtg | agcaaggggcg | 1920 |
| aggagctgtt  | caccgggggtg | gtgcccattc  | tggtcgagct | ggacggcgac  | gtaaacggcc  | 1980 |
| acaagttcag  | cgtgtccggc  | gagggcgagg  | gcgatgccac | ctacggcaag  | ctgaccctga  | 2040 |
| agttcatctg  | caccaccggc  | aagctgcccc  | tgccctggcc | caccctcggtg | accaccctga  | 2100 |
| cctacggcgt  | gcagtgtctc  | agccgctacc  | ccgaccacat | gaagcagcac  | gacttcttca  | 2160 |
| agtccgccat  | gcccgaaggc  | tacgtccagg  | agcgaccat  | cttcttcaag  | gacgacggca  | 2220 |
| actacaagac  | ccgcgcggag  | gtgaagttcg  | agggcgacac | cctggtgaac  | cgcatcgagc  | 2280 |
| tgaagggcac  | cgacttcaag  | gaggacggca  | acatcctggg | gcacaagctg  | gagtacaact  | 2340 |
| acaacagcca  | caacgtctat  | atcatggccg  | acaagcagaa | gaacggcatc  | aaggtgaact  | 2400 |
| tcaagatccg  | ccacaacatc  | gaggacggca  | gcgtgcagct | cgccgaccac  | taccagcaga  | 2460 |
| acacccccat  | cggcgacggc  | cccgtgctgc  | tgcccgacaa | ccactacctg  | agcaccctga  | 2520 |
| ccgccctgag  | caaagacccc  | aacgagaagc  | gcgatcacat | ggctcctgctg | gagttcgtga  | 2580 |
| ccgcgcgcgg  | gatcactctc  | ggcatggacg  | agctgtacaa | gtaaagcggc  | cctagagctc  | 2640 |
| gctgatcagc  | ctcgactgtg  | cctctagtgt  | ccagccatct | gttgtttgcc  | cctccccctg  | 2700 |
| gccttccttg  | accctggaag  | gtgccactcc  | cactgtcctt | tcctaataaa  | atgaggaaat  | 2760 |
| tgcacgcgat  | tgtctgagta  | ggtgtcatte  | tattctgggg | ggtgggggtg  | ggcaggacag  | 2820 |
| caagggggag  | gattgggaag  | acaatagcag  | gcattgctgg | gatgcgggtg  | gctctatggc  | 2880 |
| ttctgaggcg  | gaaagaacca  | gctggggctc  | gagtgcatte | tagttgtggt  | ttgtccaaac  | 2940 |
| tcacaaatgt  | atcttatcat  | gtctgtatac  | cgtcgacctc | tagctagagc  | ttggcgtaat  | 3000 |

|             |             |            |             |             |             |      |
|-------------|-------------|------------|-------------|-------------|-------------|------|
| catggtcata  | gctgttttct  | gtgtgaaatt | gttatccgct  | cacaattcca  | cacaacatac  | 3060 |
| gagccggaag  | cataaagtgt  | aaagcctggg | gtgcctaata  | agttagctaa  | ctcacattaa  | 3120 |
| ttgcgttgcg  | ctcactgccc  | gctttccagt | cgaggaaacct | gtcgtgccag  | ctgcattaat  | 3180 |
| gaatcggcca  | acgcgcgggg  | agaggcggtt | tgcgtatttg  | gcgctcttcc  | gcttcctcgc  | 3240 |
| tcaactgactc | gctgcgctcg  | gtcgttcggc | tgcggcgagc  | ggatcagct   | cactcaaagg  | 3300 |
| cggtaatacg  | gttatccaca  | gaatcagggg | ataacgcagg  | aaagaacatg  | tgagcaaaaag | 3360 |
| gccagcaaaa  | ggccaggaac  | cgtaaaaagg | ccgcgttgct  | ggcggttttc  | cataggctcc  | 3420 |
| gccccctga   | cgagcatcac  | aaaaatcgac | gctcaagtca  | gagggtggcg  | aacccgacag  | 3480 |
| gactataaag  | ataccaggcg  | tttccccctg | gaagctccct  | cgtagcgctct | cctgttccga  | 3540 |
| ccctgccgct  | taccggatac  | ctgtccgcct | ttctcccttc  | gggaagcgctg | gcgctttctc  | 3600 |
| aatgctcacg  | ctgtaggtat  | ctcagttcgg | tgtaggctcg  | tcgctccaag  | ctgggctgtg  | 3660 |
| tgcacgaacc  | ccccgttcag  | cccgcgcgct | gcgccttatc  | cggtaaactat | cgtcttgagt  | 3720 |
| ccaacccggt  | aagacacgac  | ttatcgccac | tggcagcagc  | cactggtaac  | aggattagca  | 3780 |
| gagcgaggta  | tgtaggcggt  | gctacagagt | tcttgaagtg  | gtggcctaac  | tacggctaca  | 3840 |
| ctagaaggac  | agtatttggt  | atctgcgctc | gtctgaagcc  | agttaccttc  | ggaaaaagag  | 3900 |
| ttggtagctc  | ttgatccggc  | aaacaaacca | ccgctggtag  | cggtggtttt  | tttgtttgca  | 3960 |
| agcagcagat  | tacgcgcaga  | aaaaaaggat | ctcaagaaga  | tcctttgatc  | ttttctacgg  | 4020 |
| ggtctgacgc  | tcagtggaaac | gaaaactcac | gttaagggat  | tttggtcatg  | agattatcaa  | 4080 |
| aaaggatctt  | cacctagatc  | cttttaaatt | aaaaatgaag  | ttttaaatca  | atctaaagta  | 4140 |
| tatatgagta  | aacttgggtc  | gacagttacc | aatgcttaac  | cagttaggca  | cctatctcag  | 4200 |
| cgatctgtct  | atttcgttca  | tccatagttg | cctgactccc  | cgtagtgtag  | ataactacga  | 4260 |
| tacgggaggg  | cttaccatct  | ggccccagtg | ctgcaatgat  | accgcgagac  | ccacgctcac  | 4320 |
| cggctccaga  | tttatcagca  | ataaaccagc | cagccggaag  | ggccgagcgc  | agaagtgggtc | 4380 |
| ctgcaacttt  | atccgcctcc  | atccagtcta | ttaattgttg  | ccgggaagct  | agagtaagta  | 4440 |
| gttcgccagt  | taatagtttg  | cgcaacgttg | ttgccattgc  | tacaggcatc  | gtggtgtcac  | 4500 |
| gctcgtcggt  | tggtatggct  | tcattcagct | ccggttccca  | acgatcaagg  | cgagttacat  | 4560 |
| gatcccccat  | gttggtgcaa  | aaagcggtta | gctccttcgg  | tcctccgatc  | gttggtcagaa | 4620 |
| gtaagtgggc  | cgcagtgtta  | tcactcatgg | ttatggcagc  | actgcataat  | tctcttactg  | 4680 |
| tcatgccatc  | cgtaagatgc  | ttttctgtga | ctgggtgagta | ctcaaccaag  | tcattctgag  | 4740 |
| aatagtgtat  | gcggcgaccg  | agttgctctt | gcccggcgctc | aatacgggat  | aataccgcgc  | 4800 |
| cacatagcag  | aactttaaaa  | gtgctcatca | ttggaaaacg  | ttcttcgggg  | cgaaaactct  | 4860 |
| caaggatctt  | accgctgttg  | agatccagtt | cgatgtaacc  | cactcgtgca  | cccaactgat  | 4920 |
| cttcagcatc  | ttttactttc  | accagcgttt | ctgggtgagc  | aaaaacagga  | aggcaaaatg  | 4980 |
| ccgcaaaaaa  | gggaataagg  | gcgacacgga | aatgttgaat  | actcatactc  | ttcctttttc  | 5040 |
| aatattattg  | aagcatttat  | cagggttatt | gtctcatgag  | cggatacata  | tttgaatgta  | 5100 |
| tttagaaaaa  | taaacaaata  | ggggttccgc | gcacatttcc  | ccgaaaagtg  | ccacctgacg  | 5160 |
| tc          |             |            |             |             |             | 5162 |